

AD-R159 449

AN ARCHEOLOGICAL OVERVIEW AND MANAGEMENT PLAN FOR THE  
LIMA ARMY TANK PLAN (U) WOODWARD-CLYDE CONSULTANTS  
WALNUT CREEK CA B STAFFORD ET AL 11 MAR 85 DARCOM-39

171

UNCLASSIFIED

CX-5000-3-0771

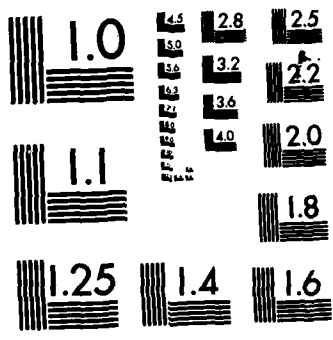
F/G 13/2

NL

END

FILED

216



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

(1)

**Final  
Report No. 39**

March 11, 1985

AD-A159 449

NTIC FILE COPY

**An Archeological Overview and  
Management Plan for the  
Lima Army Tank Plant,  
Allen County, Ohio**

Under Contract CX-5000-3-0771  
with the

**National Park Service  
U.S. Army Department of the Interior**  
Atlanta, Georgia 30303

for the  
U.S. Army Materiel Development and  
Readiness Command

by

**Barbara Stafford, Harold Hassen,  
Edward Jelks, Keith Barr,  
Marjorie Schroeder**  
Center for American Archeology  
Kampsville, Illinois 62053

DTIC  
ELECTE  
SEP 20 1985  
S A D

Prepared under the Supervision of

*Ruthann Knudson*  
Ruthann Knudson, WCC Principal Investigator

This document has been approved  
for public release and sale; its  
distribution is unlimited.

**Woodward-Clyde Consultants**

One Walnut Creek Center  
100 Pringle Avenue, Walnut Creek, CA 94596

85 09 18 033

<b>REPORT DOCUMENTATION PAGE</b>	<b>1. REPORT NO.</b>	<b>2.</b>	<b>3. Recipient's Accession No.</b>
<b>4. Title and Subtitle</b> An Archeological Overview and Management Plan for the Lima Army Tank Plant, Allen County, Ohio		<b>5. Report Date</b> March 11, 1985	
<b>7. Author(s)</b> B. Stafford, H. Hassen, E. Jelks, K. Barr, M. Schroeder		<b>8. Performing Organization Rept. No.</b> DARCOM report #39	
<b>9. Performing Organization Name and Address</b> Woodward-Clyde Consultants One Walnut Creek Center 100 Pringle Avenue Walnut Creek, CA 94596		<b>10. Project/Task/Work Unit No.</b> 60903A/0001-1	
<b>subcontractor:</b> Center for American Archeology P. O. Box 22 Kampsville, IL 62053		<b>11. Contract(C) or Grant(G) No.</b> (C) CX-5000-3-0771 (G)	
<b>12. Sponsoring Organization Name and Address</b> U. S. Department of the Interior National Park Service Russell Federal Building, 75 Spring Street SW Atlanta, GA 30303		<b>13. Type of Report &amp; Period Covered</b> FINAL	
<b>15. Supplementary Notes</b> This report was prepared as part of the DARCOM Historical/Archeological Survey (DHAS), an inter-agency technical services program to develop facility-specific archeological overviews and management plans for the U. S. Army Materiel Development and Readiness Command (DARCOM).			
<b>16. Abstract (Limit: 200 words)</b> As part of a general program in the Lima Army Tank Plant's historic preservation planning, this report documents the lack of any known archeological sites on the facility. No archeological investigations have been conducted on facility lands. In compliance with Army Regulation 420-40, it is recommended that a reconnaissance survey of a 53-acre parcel scheduled for construction be initiated. In addition, archival and oral historical research are recommended to document any historic resources that may occur on the Lima ATP. A field check may be required for those resources having high research potential and those evaluated as unique and/or significant, according to the National Register of Historic Places criteria. Archeological inventory data, together with historic architectural information, would then serve to help develop a facility Historic Preservation Plan (HPP).			
<b>17. Document Analysis</b>			
<b>a. Descriptors</b> Archeological Management Army Installation Management Environmental Assessment		reference: Thesaurus of Engineering and Scientific Terms	
<b>b. Identifiers/Open-Ended Terms</b> Cultural Resource Management Ohio Paleoenvironment Ohio Prehistory Ohio History			
<b>c. COSATI Field/Group</b> Sf			
<b>18. Availability Statement:</b> Available for public release.		<b>19. Security Class (This Report)</b> Unclassified	<b>21. No. of Pages</b> xiii + 55
		<b>20. Security Class (This Page)</b> Unclassified	<b>22. Price</b>

MANAGEMENT SUMMARY

---

The Lima Army Tank Plant (ATP) is a facility of the U. S. Department of the Army DARCOM (Materiel Development and Readiness Command), with responsibilities for the management of the prehistoric and historic archeological resources on installation lands. This report summarizes archeological resources presently identified on the installation, and the culture history of the area that provides a context for interpretation and evaluation of those resources. It also provides an assessment of the total archeological resource base likely to be found on installation lands, and recommendations for the future management of those resources within the overall context of DARCOM missions and public responsibilities.

Compliance with the National Historic Preservation Act, Archeological and Historic Preservation Act 36 CFR 800, and Army Regulation 420-40, requires the identification, evaluation, and where feasible affirmative management of significant archeological resources. These also require that federal undertakings (e.g., new construction, new leases, or lease renewals of public lands) take into consideration the effects of their proposed activities on these significant materials.

Construction of a storage facility is planned within a 53-acre parcel in the southeastern portion of the Lima ATP. It is recommended that a comprehensive records search be undertaken to compile data needed to evaluate any historic sites, and that a survey of the parcel be completed. This would include archival research, field survey to locate archeological sites, National Register evaluation, SHPO consultation, and report preparation. This work should be coordinated with the state preservation planning process, and should provide information that

supports the conduct of a cultural resource management program appropriate to the protection of heritage values in the context of a military installation.



A-1

PREPARERS AND QUALIFICATIONS

---

Barbara D. Stafford is the principal author of this report. She holds a BS summa cum laude in Sociology (minors in Anthropology and Psychology), and an MA and PhD in Anthropology. She has participated in archeological investigations across the United States and in Europe. Presently, she is a Research Archeologist with the Center for American Archeology, serving as a Principal Investigator.

Harold Hassen is a contributing author and Project Director. He holds a BA, MA, and PhD in Anthropology. He has participated in archeological investigations in the midwestern U. S. and currently holds the position of Research Archeologist with the Center for American Archeology, serving as a Principal Investigator. He has been directing projects in cultural resource management for the past five years, and is certified by the Society of Professional Archeologists in field and archival research.

Edward B. Jelks is a contributing author. He holds a BA in English and an MA and PhD in Anthropology. He has participated in extensive archeological investigations throughout the U. S., emphasizing historic resources. He is certified by the Society of Professional Archeologists in field, collections, and archival research; administration; museology; teaching; and historical archeology. He has held administrative positions since 1951 with federal, state, and university facilities. Currently, he holds the position of Professor at Illinois State University.

Keith L. Barr is a contributing author. He holds a BS in History and an MA in Archeology with an emphasis in Historical Archeology. He has

participated in archeological investigations in the Midwest and is currently affiliated with the Midwestern Archeological Research Center at Illinois State University.

Marjorie B. Schroeder is a contributing author. She holds a BS in Botany and is completing a MS in that subject. She has participated in ethnobotanical investigations in the Midwest and is currently employed by the Center for American Archeology.



ACKNOWLEDGEMENTS

---

A number of people have been extremely generous with their time and effort in the preparation of this management report. Among these are Mr. Rolly Pion and Lt. Fred Evans of the Lima Army Tank Plant; Mr. Brad Baker of the Ohio Historic Preservation Office, Columbus, Ohio; and Mr. James Batura and Ms. Frieda Vereecken-Odell of the Center for American Archeology. Ms. Ruth Sperry and Ms. Ruth Kissell typed and edited the manuscript draft.

Additional thanks to to Dr. Mark R. Barnes, NPS, SERO; Dr. Stephanie Rodeffer, NPS, MARO; and the Ohio SHPO, for reviewing the draft report; and Ms. Susan Cleveland, Contracting Officer, NPS, SERO.

Final report production, including graphics, has been completed by Woodward-Clyde Consultants, with editorial review (particularly of management recommendations) and text preparation completed by Dr. Ruthann Knudson and Ms. Betty Schmucker.

## TABLE OF CONTENTS

	Page
NTIS FORM . . . . .	ii
MANAGEMENT SUMMARY . . . . .	iii
PREPARERS AND QUALIFICATIONS . . . . .	v
ACKNOWLEDGEMENTS . . . . .	vii
LIST OF TABLES . . . . .	x
LIST OF FIGURES . . . . .	xi
FOREWORD . . . . .	xii
1.0 INTRODUCTION . . . . .	1-1
1.1 Purpose and Need . . . . .	1-1
1.2 The Lima Army Tank Plant . . . . .	1-4
1.3 Summary of Previous Archeological Work Conducted on the Lima ATP . . . . .	1-6
1.4 The Sociocultural Context of the Archeological Resources on the Lima ATP . . . . .	1-6
2.0 AN OVERVIEW OF THE CULTURAL AND RELEVANT NATURAL HISTORY OF THE LIMA ATP . . . . .	2-1
2.1 The Physical Environment . . . . .	2-1
2.1.1 Earth Resources . . . . .	2-1
2.1.2 Water Resources . . . . .	2-2
2.1.3 Modern Climate . . . . .	2-2
2.1.4 Plant Resources . . . . .	2-2
2.1.5 Animal Resources . . . . .	2-3
2.1.6 Paleoenvironment . . . . .	2-3
2.2 The Cultural Environment . . . . .	2-4
2.2.1 Prehistory . . . . .	2-4
2.2.2 Ethnohistory . . . . .	2-9
2.2.3 History . . . . .	2-9
2.3 Archeological Research Directions . . . . .	2-12

## TABLE OF CONTENTS

	Page
3.0 AN ASSESSMENT OF ARCHEOLOGICAL RESOURCE PRESERVATION AND SURVEY ADEQUACY . . . . .	3-1
3.1 Environmental Constraints to Site Preservation . . . . .	3-1
3.2 Historic and Recent Land Use Patterns . . . . .	3-1
3.3 Previous Cultural Resource Investigations: Coverage and Intensity . . . . .	3-5
3.4 Summary Assessment of Data Adequacy, Gaps . . . . .	3-5
4.0 KNOWN ARCHEOLOGICAL RESOURCES ON THE LIMA ATP . . . . .	4-1
5.0 AN ASSESSMENT OF THE SIGNIFICANCE OF THE ARCHEOLOGICAL RESOURCE BASE ON THE LIMA ATP . . . . .	5-1
5.1 The Significant Resource Base . . . . .	5-1
5.2 Ideal Goals and Objectives . . . . .	5-7
6.0 A RECOMMENDED ARCHEOLOGICAL MANAGEMENT PLAN FOR THE LIMA ATP . . . . .	6-1
6.1 Facility Master Plans and Proposed Projects . . . . .	6-1
6.2 Appropriate Archeological Management Goals within the Lima ATP's Master Plan . . . . .	6-1
6.2.1 General Facility Planning . . . . .	6-1
6.2.2 Project-Specific Resource Protection or Treatment Options . . . . .	6-7
6.2.3 A Summary of Recommended Management Directions and Priorities for Effective Compliance and Program Management . . . . .	6-8
6.3 Estimated Scope of Work and Cost Levels for Presently Identifiable Management Needs . . . . .	6-9
6.3.1 Scope of Work . . . . .	6-9
6.3.2 Implementation and Cost Estimates . . . . .	6-10
7.0 SUMMARY . . . . .	7-1
8.0 BIBLIOGRAPHY . . . . .	8-1
8.1 Primary Sources and References Cited . . . . .	8-1
8.2 Other Pertinent Literature . . . . .	8-3

## LIST OF TABLES

---

Table	Page
2-1 A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE LIMA ATP . . . . .	2-5
3-1 A SUMMARY OF HISTORIC AND/OR MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE LIMA ATP . . . . .	3-2
5-1 A SUMMARY OF SIGNIFICANT ARCHEOLOGICAL RESOURCES ON THE LIMA ATP . . . . .	5-2
6-1 A SUMMARY OF ON-GOING OR PLANNED ACTIVITIES THAT COULD AFFECT ARCHEOLOGICAL RESOURCES ON THE LIMA ATP . . . . .	6-2

## LIST OF FIGURES

---

Figure	Page
1-1 MAP OF THE GENERAL VICINITY OF THE LIMA ATP . . . . .	1-2
1-2 MASTER BASE MAP OF THE LIMA ATP . . . . .	1-5
3-1 MAP OF AREAS OF HISTORIC AND/OR MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE LIMA ATP . . . . .	3-4
6-1 MAP OF AREAS OF ON-GOING OR PLANNED ACTIVITIES THAT COULD AFFECT ARCHEOLOGICAL RESOURCES ON THE LIMA ATP . . . . .	6-3

## FOREWORD

---

As a federal agency with large public land holdings, the U. S. Army is responsible for the stewardship of a variety of natural and cultural resources that are part of its installations' landscapes. The Army's Materiel Development and Readiness Command (DARCOM) presently manages a nationwide network of 65 installations and 101 subinstallations and separate units, which range in size from one acre to over one million acres. As part of its programs of environmental and property management, DARCOM has requested that the U. S. Department of the Interior's National Park Service (NPS) provide technical guidance to develop programs for managing installation cultural resources.

NPS is thus conducting the DARCOM Historical/Archeological Survey (DHAS), which has two major disciplinary elements. The architectural review and planning function is being directed by the Service's Historic American Buildings Survey (HABS), while the prehistoric and historic archeological resource assessment and planning function is the responsibility of the Service's Interagency Resource Division (IRD). IRD has contracted with Woodward-Clyde Consultants (WCC) for the development of guidelines for the DARCOM archeological management planning effort, and for the completion of 41 overviews and plans throughout the United States. WCC has in turn subcontracted the technical studies to several regional subcontractors, with final editorial review of reports and preparation of text and illustrations handled by WCC.

This overview and recommended management plan for the archeological resources of the Lima Army Tank Plant was prepared by the Center for American Archeology, Kampsville, Illinois, under subcontract to WCC.

It follows the guidance of "A Work Plan for the Development of Archeological Overviews and Management Plans for Selected U. S. Department of the Army DARCOM Facilities," prepared by Ruthann Knudson, David J. Fee, and Steven E. James as Report No. 1 under the WCC DARCOM contract. A complete list of DHAS project reports is available from the National Park Service, Washington, DC.

The DHAS program marks a significant threshold in American cultural resource management. It provides guidance that is nationally applicable, is appropriately directed to meeting DARCOM resource management needs within the context of the Army's military mission, and is developed in complement to the state Resource Protection Planning Process (the RP3 process, through State Historic Preservation Offices). All of us participating in this effort, particularly in the development of this report, are pleased to have had this opportunity. Woodward-Clyde Consultants appreciates the technical and contractual guidance provided by the National Park Service in this effort, from the Atlanta and Washington DC offices and also from other specialists in NPS regional offices in Philadelphia, Denver, and San Francisco.

Woodward-Clyde Consultants

Ruthann Knudson

INTRODUCTION

---

The following report is an overview of and recommended management plan for the prehistoric and historic archeological resources that are presently known or likely to occur on the Lima Army Tank Plant in Allen County, Ohio (Figure 1-1). This facility is an installation of the U. S. Department of the Army DARCOM (Materiel Development and Readiness Command), which as an administrator of public land has responsibilities for the stewardship of the cultural resources that are located on it. The assessments and recommendations reported here are part of a larger command-wide cultural resource management program (the DARCOM Historical/Archeological Survey, or DHAS), which is being conducted for DARCOM by the U. S. Department of the Interior's National Park Service. The following is that portion of the facility-specific survey that is focused on the prehistoric and historic resource base of the Lima Army Tank Plant (ATP), and was developed in accordance with the Level A requirements as set forth in the archeological project Work Plan (Knudson, Fee, and James 1983). A companion architectural study is in preparation by NPS's Historic American Building Survey (HABS), but is not yet available (William Brenner, personal communication 1983).

#### 1.1 PURPOSE AND NEED

A corpus of Federal laws and regulations mandate cultural resources management on DARCOM facilities. Briefly these are:

- The National Historic Preservation Act of 1966 as amended (80 Stat. 915, 94 Stat. 2987; 16 USC 470), with requirements to,



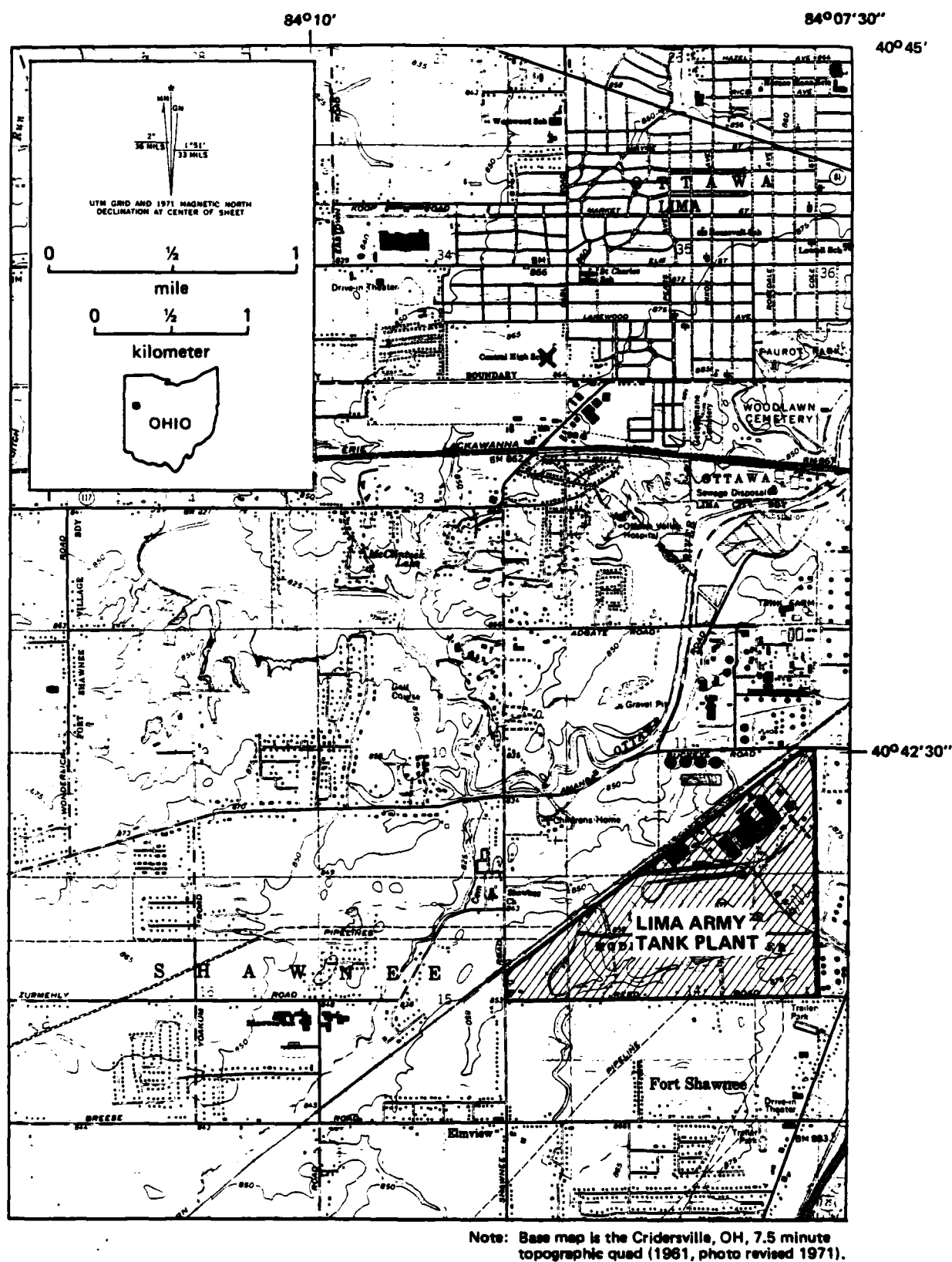


Figure 1-1. MAP OF THE GENERAL VICINITY OF THE LIMA ATP

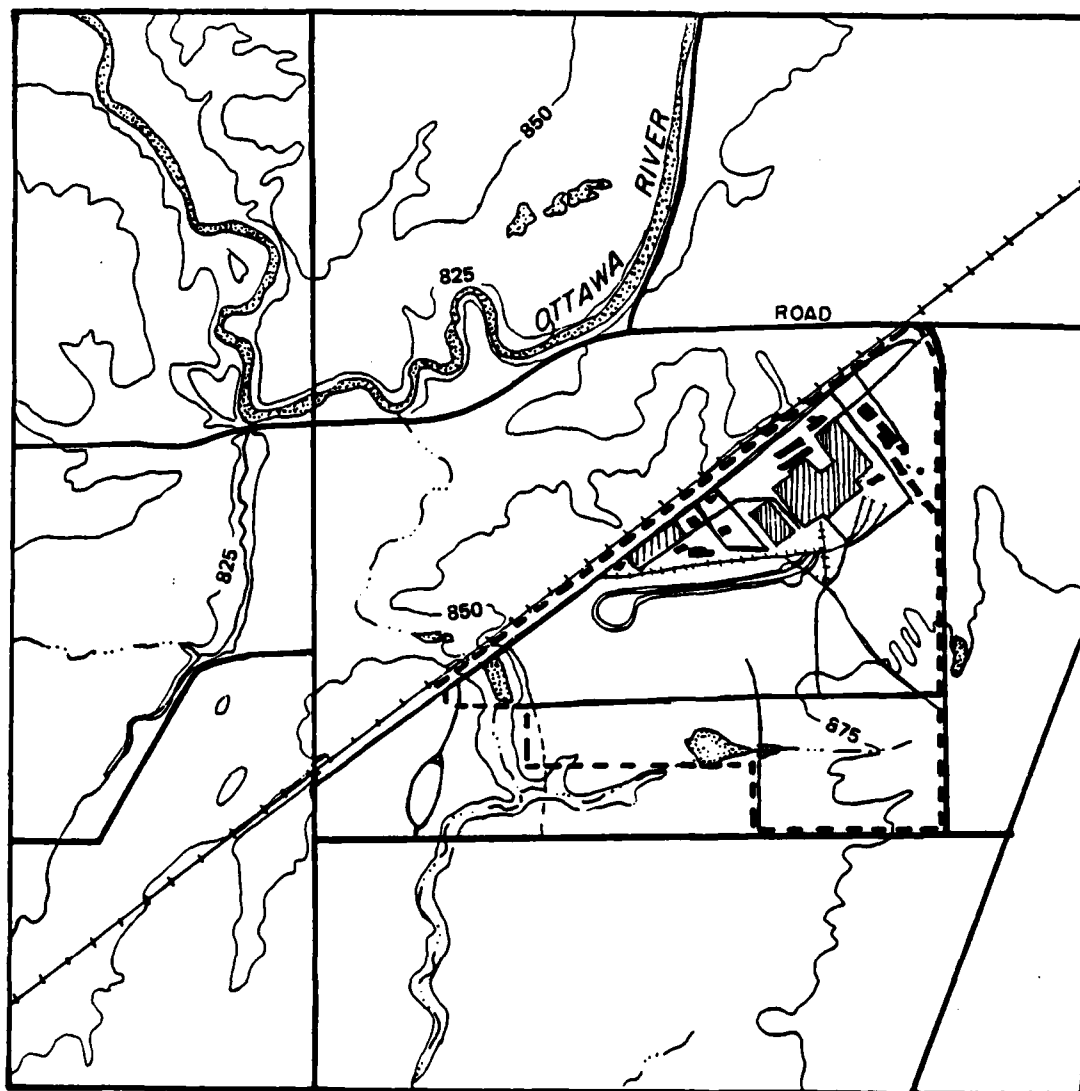
- inventory, evaluate, and where appropriate nominate to the National Register of Historic Places all archeological properties under agency ownership or control (Sec. 110(a)(2))
- prior to the approval of any ground-disturbing undertaking, take into account the project's effect on any National Register-listed or eligible property; afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the proposed project (Sec. 106)
- complete an appropriate data recovery program on an eligible or listed National Register archeological site prior to its being heavily damaged or destroyed (Sec. 110(b), as reported by the House Committee on Interior and Insular Affairs [96th Congress, 2nd Session, House Report No. 96-1457, p. 36-37])
- Executive Order 11593 (36 FR 8921), whose requirements for inventory, evaluation, and nomination, and for the recovery of property information before site demolition, are codified in the 1980 amended National Historic Preservation Act
- The Archeological and Historic Preservation Act of 1974 (88 Stat. 174, 16 USC 469), which requires that notice of an agency project that will destroy a significant archeological site be provided to the Secretary of the Interior; either the Secretary or the notifying agency may support survey or data recovery programs to preserve the resource's information values
- The Archeological Resources Protection Act of 1979 (93 Stat. 721, 16 USC 470aa; this supersedes the Antiquities Act of 1906 [93 Stat. 225, 16 USC 432-43]), with provisions that effectively mean that

- The Secretary of the Army may issue excavation permits for archeological resources on DARCOM lands (Sec. 4)
- No one can damage an archeological resource on DARCOM lands without a permit, or suffer criminal (Sec. 6) or civil penalties (Sec. 7)
- 36 CFR 800, "Protection of Historic and Cultural Properties" (44 FR 6068, as amended in May 1982); these regulations from the Advisory Council on Historic Preservation set forth procedures for compliance with Section 106 of the National Historic Preservation Act
- Regulations from the Department of the Interior for determining site eligibility for the National Register of Historic Places (36 CFR 60, 36 CFR 63), and standards for data recovery (proposed 36 CFR 66)
- United States Department of the Army procedures and standards for preserving historic properties (32 CFR 650.181-650.193; Technical Manual 5-801-1; Technical Note 78-17; Army Regulation 420-40); and procedures for implementing the Archaeological Resources Protection Act (32 CFR 229).

These procedures should be integrated with planning and management to insure continuous compliance during operations and management at each facility. This can best be achieved by an understanding of the procedures implied by the regulations and an awareness of the cultural resources potential at each facility.

## 1.2 THE LIMA ARMY TANK PLANT

The 295-acre (120 ha) Lima Army Tank Plant (ATP) is located in Lima, Allen County, Ohio (Figure 1-1, 1-2). The facility was completed for



LEGEND

-  Buildings
-  Road

0 FT 2000  
0 M 500



Figure 1-2. MASTER BASE MAP OF THE LIMA ATP

operation on 15 November 1942, for the manufacture of centrifugally cast gun tubes, but was later diverted for the machining, assembling, testing, and shipping of medium-combat vehicles. Currently, the facility is in standby condition and is government-operated. If activated, the facility would be contractor-operated with the same mission.

Construction on the installation has impacted the vast majority of the land. The only open area is in the extreme southeastern corner of the facility. No leasing programs exist on the facility.

### 1.3 SUMMARY OF PREVIOUS ARCHEOLOGICAL WORK CONDUCTED ON THE LIMA ATP

No archeological work has been conducted on the Lima ATP. No archeological sites are known to exist within the facility boundaries (Ohio State Archaeology Site Survey Files n.d.). An archeological field survey was conducted immediately north of the ATP on land within the boundaries of the Hog Creek Shawnee Reservation. No substantial remains of ethnohistoric Shawnee were found (Baker 1978).

### 1.4 THE SOCIOCULTURAL CONTEXT OF THE ARCHEOLOGICAL RESOURCES ON THE LIMA ATP

Except for the southeastern portion of the installation, the Lima ATP has almost been entirely impacted by military construction. Had there been prehistoric or ethnohistoric archeological remains, they may have been destroyed by these activities. Historic Euroamerican cultural resources probably were obliterated by the construction of the present facility. However, six residences currently used as family housing were acquired in 1951 when the facility lands were expanded to the south (U. S. Army 1977). These structures may have archeological components. They do constitute historic resources and are being investigated by the on-going National Park Service's Historic American Building Survey (HABS). Intact deposits may exist in the southeastern corner, within the tank test track, or beneath plant buildings, parking, and storage areas.

If any prehistoric archeological resources were to remain on the Lima facility, their major value would lie in their scientific research significance. In addition, the facility lies within the boundaries of the Hog Creek Shawnee Reservation. If any early historic or ethnohistoric archeological remains were preserved on the facility, they may be of sociocultural value to the historic Shawnee.

## AN OVERVIEW OF THE CULTURAL AND RELEVANT NATURAL HISTORY OF THE LIMA ATP

---

This section presents a brief discussion of the physical and cultural environments of the Lima Army Tank Plant. These data provide a baseline for considering historical land use and assessing archeological site information to produce an effective management plan for facility lands. In addition, this section describes pertinent regional archeological research directions.

### 2.1 THE PHYSICAL ENVIRONMENT

This section describes the modern earth, water, climatic, plant and animal resources that were probably available for human use during the historic period. These data can be used as a baseline against which paleoenvironmental resources may be inferred.

#### 2.1.1 Earth Resources

The Lima facility; Allen County, Ohio, is located in the Lake Plain and Till Plain Sections of the Central Lowland Physiographic Province (Fenneman 1938). Glacial drift is deposited over Monroe limestone bedrock to depths ranging from a few feet to several hundred feet in thickness over the county (Heffner et al. 1965:2).

Physiographically, the county is a nearly level to undulating till plain with three major end moraines running east-west. A large glacial lake was formed north of Lima during glacial retreat; prominent beach ridges run alongside the moraines. The elevation of the land rises from

the glacial lakebed towards the south. Soils on the facility grounds are classified as urban. Adjacent lands belong to the Blount silt loam and Pewamo silty clay loam series. These are somewhat poorly drained to very poorly drained (Heffner et al. 1965).

Oil was discovered in 1885 near the city of Lima and the area has since been the site for large oil refineries and related industries (Heffner et al. 1965:1).

#### 2.1.2 Water Resources

The northern boundary of the Lima ATP lies less than a mile from the Ottawa River which drains into the Maumee River. Several intermittent creeks and a few lakes or ponds are found within the facility boundaries.

#### 2.1.3 Modern Climate

The climate in the vicinity of the Lima ATP is characterized as continental. Temperatures are tempered by a cool-air sink in the bed of an extinct glacial lake north of Lima (Heffner et al. 1965:2). The average daily maximum temperature ranges from 36.9°F. (2.7°C) in January to 86.6°F. (30.3°C) in July. The average daily minimum temperature ranges from 21.1°F. (-6.1°C) to 62°F. (16.7°C) over the same period. Temperature extremes are from 0°F. to over 100°F. (-17.8°C to 37.8°C). The majority of precipitation (rain) falls in June, the smallest amount in February; these amounts are 4.02 inches (10.2 cm) and 2.01 inches (5.1 cm), respectively. During the early afternoon the average relative humidity is about 50 percent during the summer and as high as 70 percent in winter (Heffner et al. 1965).

#### 2.1.4 Plant Resources

The dominant vegetation in the area is the beech deciduous forest community. Associated species include sugar maple, red oak, white ash, and white oak, with some basswood, hickory, and black cherry (Gordon 1966). All these would have provided food and/or utility materials to Native American inhabitants in the area during presettlement times.



Only about ten percent of the total county acreage now remains wooded, the remainder having been cleared for agriculture. Allen County borders the eastern edge of the "Corn Belt"; soybeans and corn are the principal crops. Wheat, oats, and hay are also extensively grown (Heffner et al. 1965:4).

#### 2.1.5 Animal Resources

The animal populations in the area of the Lima ATP have undergone drastic changes in distribution and number since the time of Euroamerican settlement. Elk and bison disappeared from the area around the time of settlement; bear, cougar, and most of the deer herds which were once numerous have since vanished (Heffner et al. 1965:33). The northwestern part of Allen County would have provided fish, game birds, and game animals in abundance in the area known as the Great Black Swamp. Rabbit, squirrel, raccoon, quail, and pigeon would have been available throughout the area.

#### 2.1.6 Paleoenvironment

The pollen record for Ohio indicates that from about 14,000 to 11,000 BP, spruce and fir dominated the boreal vegetation of that area under conditions much cooler and moister than today (Ogden 1966). This was followed by a drier, warmer period represented by an increase in pine and oak and a decrease in spruce and fir, and an increase in non-arboreal pollen such as grasses and sedges, indicative of a generally more open vegetation type. This changed abruptly with increased warmth and moister conditions around 9800 BP when a mixed deciduous forest was established with beech and elm as major components. Beech declined with increasing warmth and/or dryness throughout the mid-Holocene Hypsithermal, and at that time the prairie extended eastward into Ohio. Hickory reached a maximum around 3600 BP (Ogden 1966:396). With a return to cooler, moister conditions after 1300 BP, beech and other mesophytic species became established, including elm, maple, walnut, sugar gum, cherry, and basswood.

## 2.2 THE CULTURAL ENVIRONMENT

An overview of the cultural chronology of the Lima facility area and surrounding region within 100 miles (160 km) is presented in Table 2-1.

### 2.2.1 Prehistory

The Lima ATP is located in a region of well-documented prehistoric activity. Prehistoric traditions represented in Allen County include Paleo-Indian, Archaic, Archaic/Woodland (Glacial Kame), Woodland, and Late Prehistoric (Fort Ancient).

During the Paleo-Indian tradition (10,500 to 8000 BC) hunting of both megafauna and smaller game animals and gathering of wild plant resources were the major economic pursuits. Archeological sites may include kill sites, base camps, or special use sites. However, given the scarcity of these early remains, isolated artifactual finds representing hunting activities may be all that are found on the facility.

The Archaic tradition (8000 to 600 BC) saw the intensification of a hunting-gathering subsistence. The increased population inhabited small seasonal or base camps in riverine and forested area. Hunting and gathering continued with an increased use of vegetal foods and aquatic and nut resources.

Sometime during the Archaic tradition a burial complex known as Glacial Kame began and lasted until 500 BC. Nothing is known of Glacial Kame except for burials in glacial kames or knolls of gravel or sand.

The Woodland tradition (1000 BC to AD 400) was characterized by the following: increased reliance on plant resources, and later by the dependence on cultivated plants; the first evidence for ceramic technology during the Early Woodland; increased population density; a socio-political complex known as Hopewell during the Middle Woodland; and greater localization of populations during the Late Woodland.

Table 2-1. A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE LIMA ATP

Cultural Unit		Kinds of Archeological Remains Representative of Period			
Tradition	Period or Phase	Date <sup>1</sup>	General Settlement Patterns	General Subsistence Systems	
American	Late Industrial	Present to AD 1920	Farm population decreases as individual farm holdings expand; automobiles and expanding road network contribute to urbanization; Lima Army Modification Center is established in Allen County in 1942	Agriculture: soybeans, corn, wheat (three leading cash crops), feeder cattle, truck farming; manufacture of trucks, buses	Dominance of American manufactured goods; automatic machine-made glass containers; decal-decorated ceramics; plastic disposable packaging
American	Early Industrial	AD 1920 to AD 1850	By 1850s most of the good land in Allen County and surrounding region has been sold, and about 25% of all land is under cultivation; Lima becomes the key marketing town of region; owing to railroads, Lima becomes an important transportation center	Agriculture, lumbering, oilfields	English white ironstone ceramics at beginning of period; American ceramics dominating at end of period; clay marbles; semiautomatic mold-blown bottles; canning jars with metal rims and glass liners; wire nails
American	Homestead	AD 1850 to AD 1819	Allen County formed in 1820; county seat, Lima, platted in 1830-1831; in 1830 white residents are still outnumbered by native Americans; early roads mostly adhere to section and township lines; Shawnee structures (Hog Creek Reservation, 1817-1833) are used by first white settlers; under Andrew Jackson's administration, the Native American population is removed to western reservation	Agriculture, lumbering, limestone quarrying, tanneries, flourmills	Log structures (early); limestone, post and beam, and balloon frame structures; English ceramics; pearlware, blue and green shell-edge, handpainted, slip-banded; English flatware; hand-forged (early) to machine-cut (late) nails; free-blown glass containers
American	Frontier	AD 1819 to AD 1783	Region around Lima and Allen County is largely unexplored when Ohio wins statehood in 1803; Native Americans, traders, and occasional military detachments occupy or travel the area in this period	Hunting; trapping; subsistence agriculture; trading	Temporary camps; log structures; fortification; Native American villages with house remains

Table 2-1. A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE LIMA ATP (continued)

Cultural Unit		Kinds of Archeological Remains Representative of Period		
Tradition	Period or Phase	Date <sup>1</sup>	General Settlement Patterns	General Subsistence Systems
Colonial	European Competition	AD 1783 to AD 1713	Agents from Montreal and Albany and emissaries of Pennsylvania trader, George Croghan, compete for Native American trade; the French establish a series of outposts to stem the tide of British expansion	Hunting and gathering; trading; subsistence agriculture
	Native American		Ohio becomes a refuge for Native American groups, such as the Miami, Shawnee, Seneca, Delaware Wyandot, and Ottawa; semi- permanent summer agricultural villages; winter hunting camps in sheltered valleys	Temporary campsites; small, crude log structures; fortified encamp- ments; cache pits; gunflints; metal knives and axes; free-blown bottles; hand-forged nails; kettle brass; falence earthenware; English salt-glazed and creamware ceramics
Colonial	Early Exploration	AD 1713 to AD 1690s	First Europeans in area were French explorers followed by fur traders	Villages with house remains; log structures (late in period); pit features; middens; European trade goods such as gunflints, metal knives and axes, glass beads, brass kettles, silver ornaments
	Native American		Region is largely uninhabited except for war/hunting parties of Iroquois and Algonquian peoples	Temporary campsites; cache pits; kettlebrass; iron knives and hat- chets; gun parts and flints
Late Pre- historic	Fort Ancient	AD 1650- to AD 1000	Population nucleation with contin- ued settlement patterns of Late Woodland	Transient hunting and special activity camps; stone tools; Euro- pean trade goods such as glass beads, brass kettles, metal knives and axes, guns, silver ornaments
Woodland	Late	AD 1000 to AD 400	Greater localization of popula- tions; sites in variety of en- vironmental settings; smaller more numerous sites than during Middle Woodland	Characteristic artifacts include shell-tempered Madisonville Focus pottery
				Diverse ceramic styles, small tri- angular points; sharp decrease in Hopewell Interaction Sphere items

Table 2-1. A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE LIMA ATP (continued)

Cultural Unit			Kinds of Archeological Remains Representative of Period	
Tredition	Period or Phase	Date <sup>1</sup>	General Settlement Patterns	General Subsistence Systems
Middle-Hopewell		AD 500 to 500 BC	Population increase with small seasonal or base camps, habitation sites, earthworks, and mortuary-related sites located in full spectrum of ecological zones	Dependence on cultivated plants (starchy and oily seeded species; squash, bottle gourd); hunting (particularly deer); gathering of wild plants; trade in exotic items
Early-Adena		200 BC to 1000 BC	Small seasonal or base camps with possibly increased sedentism; villages; mortuary sites and burial mounds	Hunting and gathering; increased reliance on plant resources
Archaic/Woodland	Glacial Kame	?? to 500 BC	Burial sites in glacial kames, knolls of gravel or sand	Unknown; only burials recovered; presumably similar to Late Archaic and Early Woodland
Archaic	Late	600 BC to 4000 BC	Spring-summer encampments, autumn hunting and gathering camps, winter hunting camps, cemeteries	Hunting and gathering of small game animals; utilization of nut and aquatic resources in cooler, moister environmental conditions
Middle		4000 BC to 6000 BC	Slightly greater population located in small seasonal or base camps in riverine and forest areas; decreasing mobility	Hunting and gathering of small game animals; increased utilization of aquatic and nut resources in a warmer dryer environment
Early		5000 BC to 8000 BC	Small seasonal or base camps in riverine and forest areas; probably semi-permanent or repeatedly occupied special activity sites and utilization of rock-shelters increased; in addition to site types found in Paleo-Indian, isolated burials and open campsites are found	Gathering; hunting of smaller game animals, e.g., deer, elk; more diversified economy; increase in use of vegetal foods; exploitation of more local sources during Hypsithermal
				Habitat sites with variable number of structures and pit features, large mortuary related sites including mounds, charnel houses, habitation areas; small seasonally occupied sites dependent on available plant and animal resources; Hope-well Interaction Sphere items; corner notched and stemmed projectile points; stamped incised and cord-impressed ceramics
				First evidence for ceramic technology; variety of projectile points
				Flexed burials, shell gorgets, ornaments, copper, red ochre
				Lithic scatters with a variety of projectile points; ground stone; general purpose tool kits; heavy concentration of artifacts possible in some locations
				Lithic scatters with side-notched points common; groundstone common
				Lithic scatters with groundstone, side-notched and stemmed points, side-notched scrapers; utilization of local cherts

Table 2-1. A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE LIMA ATP (concluded)

Cultural Unit		Period or Phase	Date <sup>1</sup>	General Settlement Patterns	General Subsistence Systems	Kinds of Archeological Remains Representative of Period
Tradition						
Paleo-Indian			8000 BC to 10,500 BC	Hunting and gathering loci in upland and valley areas; types of sites include isolated kill sites, communal kill sites, quarries, chipping stations, and rock shelter sites	Utilization of megafauna (mastodon, mammoth, bison, muskrat, giant beaver); utilization of smaller animals; gathering	Diagnostic projectile points include large fluted points and large, un- fluted lanceolate points; points may occur as isolated finds

<sup>1</sup> Prehistoric dates from Baker (1978), and Ohio RP3, (Ohio Historic Preservation Office 1982); historic information based on Baker 1978; Carnes and Hughes 1976; Hunter 1978; Roseboom and Weisenburger 1953; Warner, Beers, and Co. 1885.

Population nucleation, maize agriculture, and shell-tempered pottery are characteristic of the late prehistoric or Fort Ancient tradition (AD 1000 to 1650).

### 2.2.2 Ethnohistory

The ethnohistoric and early historic Native American inhabitants of northwestern Ohio were primarily the Shawnee, who inhabited the Allen County area and participated in hunting, gathering, agriculture, and trade in deerskins (Callender 1978). The Shawnee Hog Creek Reservation included the area of the present-day Lima ATP. The reservation was officially recognized in 1817 by the Treaty of Maumee Rapids and comprised an area of 25 square miles. It adjoined the Wapakoneta reserve and was also located near a 48-square-mile Seneca and Shawnee reservation near Lewiston. Shawnee settlement of the Hog Creek area probably began in 1795 (Baker 1978:10). The Shawnee were removed from the reservation in 1833.

### 2.2.3 History

Two cultural traditions are recognized within the historic period for the region of the Lima ATP. The Colonial and American traditions comprise cultural resources attributable to peoples of Euroamerican origins that date, respectively, before and after the American Revolution. The Colonial Tradition is divided into an Early Exploration Period and a European Competition Period. Within the American Tradition, four periods are recognized: Frontier, Homestead, Early Industrial, and Late Industrial.

For some time the chain of mountains to the East and the Iroquois were formidable barriers to Euroamerican occupation of the Ohio Country (Hunter 1978; Roseboom and Weisenburger 1953). The area was not penetrated by European and American traders until Native American groups were forced to move into present-day Ohio because of westward expansion of the coastal colonies and intertribal rivalries over the fur trade (Roseboom and Weisenburger 1953). The traders followed the Native

Americans, establishing outposts on the Ohio River and its tributaries and along the shore of Lake Erie.

Northwestern Ohio then was a heavily forested marshland called the Great Black Swamp that was considered nearly impenetrable and certainly uninhabitable (Roseboom and Weisenburger 1953); thus, it was the last part of Ohio to be explored and settled (Carnes and Hughes 1976).

During the European Competition period, Ohio became home to a number of displaced Native American groups. European and American traders, speculators, and squatters followed the migrants (Roseboom and Weisenburger 1953). Northwestern Ohio remained largely unexplored until the 19th century, however.

Not until after the War of 1812 when American troops crossed the Black Swamp, building outposts and forts along its rivers, did Americans show interest in settling the region (Carnes and Hughes 1976). Fort Amanda, established on the Auglaize River in 1812, was the first American settlement in Allen County (Warner, Beers, and Company 1885:215). The fort apparently was part of a defensive line from Upper Sandusky to St. Marys along the southern border of the Black Swamp, and served briefly as a shipyard where scows were built for use on the lower Miami River (Warner, Beers, and Company 1885:215, 219).

In 1817 lands granted the Shawnee under terms of the Greenville Treaty (1795) were taken, except for village sites (Carnes and Hughes 1976:15; Warner, Beers, and Company 1885:202-203). In 1819 a government land office opened in Piqua, paving the way for settlement (Carnes and Hughes 1976).

Native Americans, who outnumbered settlers in the project area in 1830, were gone by 1833, having been removed to Kansas under Andrew Jackson's administration (Carnes and Hughes 1976). The log structures on the Hog Creek Reservation (Shawnee Township) were appropriated by Euroamerican settlers (Baker 1978:10).



The earliest farmstead sites likely lie on high ground near streams, springs, and traces. Breesewood is one such site, located on a blufftop in Shawnee Township, and has been occupied since 1832; a brick dwelling, built in the Federal style, dates from 1848 (Baker 1978:11, Appendix A; Warner, Beers, and Company 1885:541, 785-786). Historical documents identify a number of farmsteads, schools, churches, and mills from the Homestead Period in the region.

By the 1850s, the distribution of farmsteads was nearly complete in Allen County, for the good land had been taken up (Carnes and Hughes 1976). Archeologically, most earlier farmstead sites will have vestiges of log dwellings and of nearby later homes made of sawn lumber and/or masonry. A similar shift to larger barns and outbuildings should be evident in the archeological record. During the Early Industrial period Lima became the commercial, industrial, and transportation center of the area (Carnes and Hughes 1976:10, 122).

Since World War II, newcomers have added greater ethnic diversity to the area, as southern Blacks, eastern Europeans, Asians, and Spanish-speaking persons from the Americas have settled in Lima (Carnes and Hughes 1976:587). Influences of these new ethnic groups should be expressed archeologically in artifacts and ecofacts related to dress, diet, architecture, household tasks, settlement pattern, and other aspects of their cultures.

The Lima ATP was established in an agricultural setting approximately two miles southwest of the city of Lima in 1942 (U. S. Army 1977:1). Although some 39 archeological sites have been reported in Allen County, none is located within the bounds of the Lima Army Tank Plant property (U. S. Army 1977). However, a new set of historic archeological resources has been created through the construction of the Lima ATP and through the activities that have taken place there. Although these are too recent to fall under statutory protection, they may constitute an important cultural resource that deserves conservation management in the future.

### 2.3 ARCHEOLOGICAL RESEARCH DESIGNS

The Ohio Historic Preservation Office has initiated a resource protection planning process (RP3) for Ohio (Ohio Historic Preservation Office 1982), including an RP3 study unit with reporting charts for southwest Ohio (Ohio Historic Preservation Office 1983). Paleo-Indian through Middle Archaic chronological study units have been completed for the Western Lake Erie (northwestern Ohio) spatial prehistoric unit of analysis (Ohio Historic Preservation Office 1984), the area in which the Lima ATP is located. Relevant archeological study units for this area include Paleo-Indian (No. 1), Early Archaic (No. 4), Late Archaic-Early Woodland (No. 11), Early Woodland-Middle Woodland (No. 15), Late Woodland-Late Prehistoric (No. 23), and Late Prehistoric-Protohistoric (No. 28). Historic temporal study units for Ohio, and the associated Lima ATP spatial study unit, include the Contact/Exploration Period (pre-AD 1795), Pioneer/Settlement Period and Rural/Agricultural Dominant Period (1795-ca. 1880)(Spatial Unit No. 5), Industrial/Urban Dominant Period (ca. 1880-1930)(Spatial Unit No. 9), and Modern Contemporary Period (1930-present)(Spatial Unit No. 17)(Ohio Historic Preservation Office 1984).

Paleo-Indian sites in Ohio consist of isolated artifactual finds from surface contexts likely representing hunting activities. Even though hunting was a major subsistence activity, Paleo-Indian groups also used other food resources. Subsistence strategies, social structure, and adaptations to changing natural environments are important research topics.

During the Archaic tradition in Ohio, economic pursuits and associated technologies and settlement patterns became increasingly diversified. Also, population density, group size, sedentism, and mortuary behavior increased. Research on Archaic sites should be directed to both the causes and effects of these changes.

Investigation of the trends of increased mortuary behavior, sedentism, reliance on cultivated plants, status differentiation, and use of exotic raw materials can be examined with data from Woodland sites. Particular research questions include the mechanism and effects of the introduction of ceramics during the Early Woodland; increased dependence on cultivated plants, increased mortuary behavior and social differentiation, and the effects of the Hopewell Interaction Sphere during the Middle Woodland; and the supposed increase of egalitarianism, yet lack of dramatic changes in subsistence practices during the Late Woodland.

The Late Prehistoric period in Ohio, Fort Ancient, is differentiated from the Woodland tradition by population consolidation in large villages which were often stockaded, and reliance upon corn (maize) agriculture.

Fort Ancient peoples may represent the ethnohistoric Shawnee (see Section 2.2.2). Important research questions for this period include examination of late prehistoric subsistence and settlement patterns and changes thereof as a result of contact, the effect of Euroamerican disease and tribal warfare on Native American populations, and acculturation of Native American communities following Euroamerican contact.

Research into historic resources can be extremely varied. Pertinent research questions may include the sociocultural (especially economic) effects of French and English trade on Native American, Euroamerican, and European cultures; adaptations by American farmers to local environments and to regional and national economic and political events (including environmental factors affecting selection of farmsteads, exploitation of local resources, degree of self-reliance of farmstead units, dependence on imported goods, agricultural practices, trade and communication routes, and popular artifactual styles); and reconstruction of the lifestyles and socio-cultural values of historic Native Americans and rural farming communities of the American tradition.

## AN ASSESSMENT OF ARCHEOLOGICAL RESOURCE PRESERVATION AND SURVEY ADEQUACY

---

Environmental and historic constraints may limit the preservation of archeological sites. These constraints are considered in this section, as are previously conducted resource investigations. Also, an assessment is made as to the adequacy of data collection, documenting any gaps that may exist.

### 3.1 ENVIRONMENTAL CONSTRAINTS TO SITE PRESERVATION

Historic and recent modification of the Lima ATP has obliterated or removed any intact surface archeological remains except in the extreme southeastern corner of the facility and within the tank test track. No environmental constraints to site preservation exist within these areas. Buried archeological deposits may exist beneath impacted areas.

### 3.2 HISTORIC AND RECENT LAND USE PATTERNS

Prior to construction of the facility, the Lima ATP was used for agricultural purposes (Rolly Pion, personal communication 1984). No leasing programs exist on the facility.

Approximately 82 percent of the Lima ATP has been impacted by some sort of ground disturbance (Table 3-1, Figure 3-1). Except for the military family housing units and the tank test track (GDAs 3-6), from 90-100 percent of the surface of the ground disturbance areas have been impacted. GDAs 5 and 6 lie just outside the southern facility boundary. Depths of disturbance range from 1 to 20 feet.

Table 3-1. A SUMMARY OF HISTORIC AND/OR MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE LIMA ATP

GDA No. <sup>a</sup>	Type of Disturbance	Date Conducted (yr)	Reference	Area Disturbed (acres)	Estimated Depth Below Surface (ft)	Ratio of Disturbed to Total Area	Location of Disturbed Area						Coincidental Sites	
							UTM <sup>b</sup>	Legal Reference <sup>c</sup>				USGS Quad Map <sup>c</sup>		
								Northing	Easting	Township	Range			Section
Warehouses,														
1	Manufacturing, Administration	1943-80	Facility Maps	96.8	3-15	9:10	4509680 4510000 4509400	742700 742440 741700	4S	6E	11,12	C761R	None	
Paved Storage														
2	Area	1943-80	Facility Maps	25.7	1	1:1	4509000 4509580 4509340	742700 742620 742400	4S	6E	11,12 13	C761R	None	
Sanitary Fill 1982, Test Track and 1975 and Family Housing pre-1950														
3			Facility	110	3-20	1:3	4509300 4509120 4509280	742240 741660 741640	4S	6E	11,14	C761R	None	
Military Housing														
4		pre-1950	Facility Maps	.52	10	1:3	4508550	742650	4S	6E	14	C761R	None	
Military Housing														
5		pre-1950	Facility Maps	1.44	10	1:3	4508520	741850	4S	6E	14	C761R	None	
Military Housing														
6		pre-1950	Facility Maps	2.30	10	1:3	4508480	741450	4S	6E	14	C761R	None	
Pond														
7			Facility Maps	3.5	20	1:1	4508920 4509040 4509070	741360 741290 741350	4S	6E	14	C761R	None	
Ponds, Dam														
8			Facility Maps	6.8	20	1:1	4508770 4508860 4508710	742260 741975 741975	4S	6E	14	C761R	None	

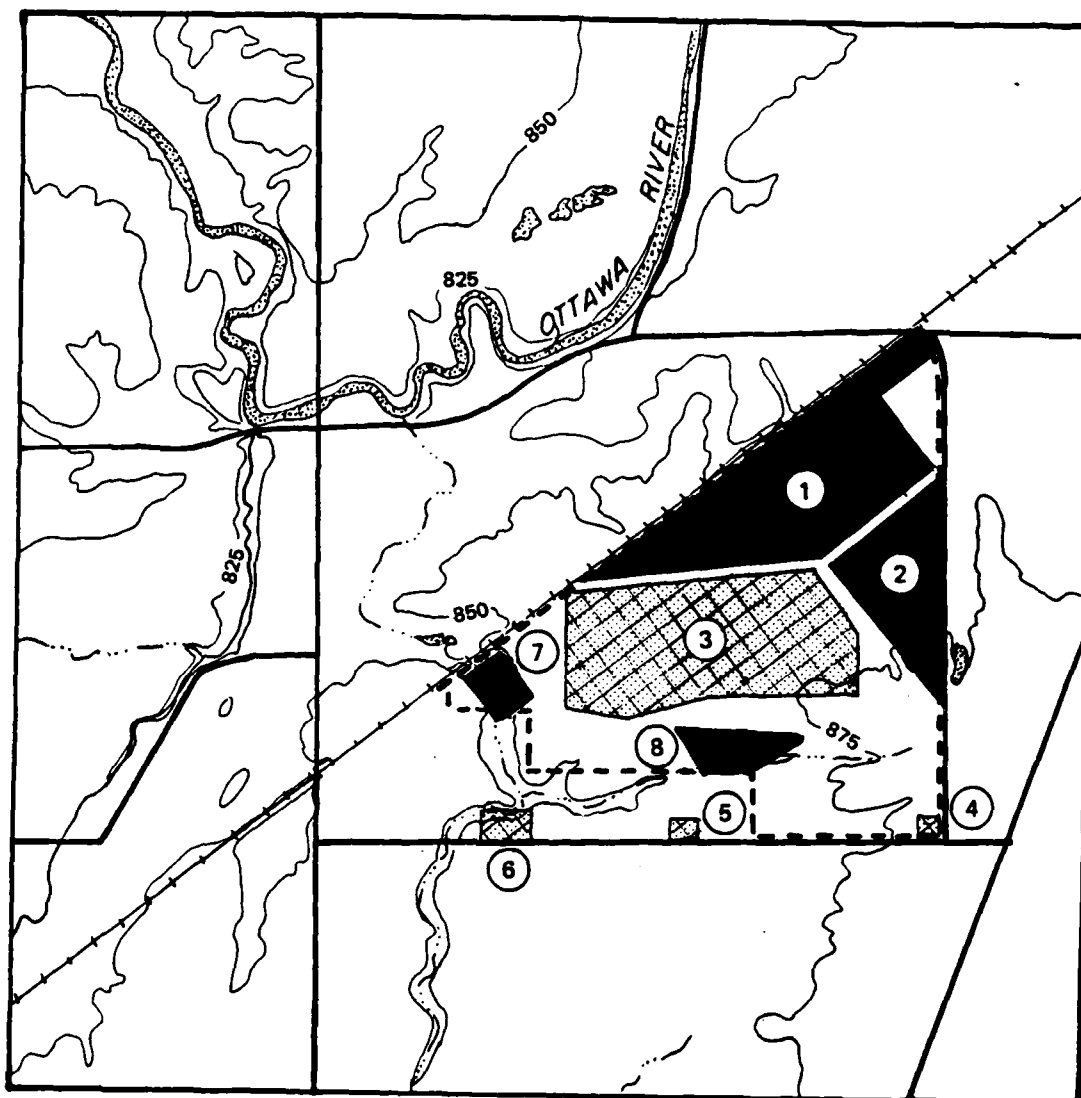
Table 3-1. A SUMMARY OF HISTORIC AND/OR MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE LIMA ATP  
(concluded)

GDA No. <sup>a</sup>	Type of Disturbance	Date Con- duct- ed (yr)	Reference	Area Dis- turbed (acres)	Esti- mated Depth Below Surface (ft)	Ratio of Dis- turbed to Total Area	Location of Disturbed Area						Coinci- dental Sites
							UTM <sup>b</sup>	Legal Reference <sup>c</sup>	Town- ship	Range	Section	USGS Quad Map <sup>c</sup>	

<sup>a</sup> Ground Disturbance Areas (GDAs) as mapped in Figure 3-1. GDAs 5 and 6 lie just outside the southern facility boundary.

<sup>b</sup> UTM = Universal Transverse Mercator coordinates, Zone 16. If the area is less than 10 acres in extent, the coordinates record the approximate center of the site. If it is larger, they record the corners of a 3-or-more sided figure than encloses the site. Coordinates have been calculated specifically by CAA for this study.

<sup>c</sup> C761R = Gridersville, OH, 7.5 min. sheet (1961, photorevised 1971).



# LEGEND

## Percent of Total Area Disturbed



< 30%



30%-60%



60%-90%



> 90%

## Depth of Disturbance



6 in-3 ft



3 ft-6 ft



> 6 ft



① GDA Number (see Table 3-1)

0 FT 2000  
0 M 500



Figure 3-1. MAP OF AREAS OF HISTORIC AND/OR MODERN  
GROUND DISTURBANCE THAT MIGHT LIMIT THE  
PRESENT ARCHEOLOGICAL RESOURCE BASE ON  
THE LIMA ATP

### 3.3 PREVIOUS CULTURAL RESOURCE INVESTIGATIONS: COVERAGE AND INTENSITY

No archeological surveys were conducted on the Lima ATP prior to its construction in 1942 or to date, and no archeological sites are known to exist within the facility boundaries. A survey of the historic architectural resources on the ATP has been completed (William Brenner, personal communication 1983) but is not yet available for integration with the archeological evaluations.

An archeological field survey was carried out immediately north of the Lima facility, on land within the boundaries of the Hog Creek Shawnee Reservation. The survey failed to find any substantial remains of an ethnohistoric Shawnee occupation (Baker 1978).

### 3.4 SUMMARY ASSESSMENT OF ARCHEOLOGICAL DATA ADEQUACY AND GAPS

The lack of information on archeological resources on the Lima facility is due mainly to the extensive nature of the ground disturbance on the facility, such that a surface pedestrian field survey is not feasible except in the extreme southeastern portion or within the tank test track area.



KNOWN ARCHEOLOGICAL RESOURCES ON THE LIMA ATP

---

There are no known or potential archeological sites presently recorded on the Lima ATP. Such resources could be preserved on the surface in the southeastern portion of the facility or within the tank test track area. Subsurface cultural deposits may be preserved beneath modern construction or impact areas.

5.0

AN ASSESSMENT OF THE SIGNIFICANCE OF THE  
ARCHEOLOGICAL RESOURCE BASE ON THE LIMA ATP

---

No archeological sites are known on the Lima ATP, though significant prehistoric and historic sites exist in the vicinity. The surface of the facility has been almost totally impacted by modern construction; however intact cultural material may remain in the soils below these construction areas and also within undisturbed soils in the southeast portion of the facility within the test track area.

#### 5.1 THE SIGNIFICANT RESOURCE BASE

A tabular summary of the potential archeological resource base is presented chronologically in Table 5-1.

Potential Paleo-Indian archeological resources would represent large to small game exploitation and wild plant utilization within the area and probably would consist of isolated artifacts. Paleo-Indian remains would most likely be small, seasonally-occupied camp sites, or more probably isolated occurrences of projectile points or point fragments. Given the scarcity of such remains in the region overall, their research value would be high.

During the Early Archaic Period, various resources were exploited according to a seasonal schedule of availability. During the Middle Archaic period, people relied on more concentrated and less mobile resources, which resulted in an increase in storage facilities, decreased settlement mobility, and increased use of aquatic resources.

Table 5-1. A SUMMARY OF SIGNIFICANT ARCHEOLOGICAL RESOURCES ON THE LIMA ATP

Temporal Unit	Thematic Unit	Resource Type	Type Occurrences <sup>a</sup>		Sociocultural Association	Landform Association	Physical Integrity	Research Value <sup>b</sup>	RV CR <sup>c</sup>	Socio-cultural Value <sup>d</sup>	SCV CR <sup>c</sup>	
			Known Occurrences (no.)	Potential Occurrences (no.)								
American	Domestic/Agricultural/Technology	Probable farmstead/schools/cemeteries/churches	0	0	+	Euro-american	Uplands	Unknown	4	2	2	3
Late Prehistoric	Villages, burial mounds, hunting camps, special use camps	Habitation	0	0	+	Native American	Uplands	Unknown	4	2	1	3
Late Woodland	Small game, wild and cultivated plant procurement and use	Probable small camp or habitation	0	0	+	Native American	Uplands	Unknown	4	2	1	3
Middle Woodland	Small game, wild plant, and cultivated procurement and use	Probable camp and burial	0	0	+	Native American	Uplands	Unknown	4	2	1	3
Early Woodland	Small game and plant procurement	Probable small seasonal or temporary camp	0	0	+	Native American	Uplands	Unknown	4	2	1	3
Archaic	Small game and wild plant procurement and use	Probable small seasonal camp	0	0	+	Native American	Uplands	Unknown	4	2	1	3
Paleo-Indian	Big game procurement and use	Probable kill area or camp	0	0	+	Native American	Uplands	Unknown	4	2	1	3

<sup>a</sup> The number of presently known or potential archeological resources of this type is specified here. In addition a judgement has been made as to the likelihood that other members of this resource occur within the facility, based on an analysis of the ethnohistoric or historic land use patterns and/or a review of the landform patterning of prehistoric materials. The probability of these additional occurrences has been noted as negative (-), positive (+), or highly positive (++).

Table 5-1. A SUMMARY OF SIGNIFICANT ARCHEOLOGICAL RESOURCES ON THE LIMA ATP (concluded)

Temporal Unit	Thematic Unit	Resource Type	Type Occurrence <sup>a</sup>			Sociocultural Association	Landform Association	Physical Integrity	Research Value <sup>b</sup>	RV CAC	Socio-cultural Value <sup>d</sup>	SCV CAC
			Known Occurrences (no.)	Potential Occurrences (no.)	Other Likely Occurrences (no.)							

<sup>b</sup> This is a subjective summary assessment of the overall research value (RV) of the resource class. It is an evaluation of the class' quality of preservation, representation of activity diversity or uniqueness, and temporal distinctiveness or reflection of diachronic relationships. It incorporates the need to avoid triviality, but to acquire what may be redundant data so as to discern patterns among those data. Based on these research values, the resource classes under discussion are ranked from 0 (no value) to 5 (highest value), including "NA" if such an evaluation is believed to be impossible given the available information.

<sup>c</sup> The Confidence Rating (CR) is a further evaluation of the perceived reliability of the research (RV) or sociocultural (SCV) values of the resource class. 1 = the judgement is more guess than science, and likely not to be reliable; 2 = the judgement is moderately reliable; 3 = the judgement is most likely reliable.

<sup>d</sup> This is a subjective summary assessment of the overall sociocultural value (SCV) of the resource class. It is an evaluation of the social, religious, or political importance of the resource to a contemporary community, from 0 (no value) to 5 (highest value).

These changes in the archeological record coincide with environmental changes during the Hypsithermal (Wendland 1978). Increasing dryness and grassland expansion could be one reason why hunter-gatherer groups abandoned the uplands (Carmichael 1977; Hajic 1981; O'Brien, Warren and Lewarch 1982). Whatever the reason for the predominance of Early Archaic sites and the scarcity of Middle Archaic sites in the uplands, the reflection or variance from this pattern by the archeological resources on the Lima ATP (Carmichael 1977; Conrad 1981; Hassen et al. 1981; Klippel and Maddox 1977; Lewis 1977) is a significant scientific question.

The research value of any Early and Middle Archaic sites with integrity located on the facility is likely to be high because they may contain information useful in:

- (1) determining the degree and type of human mobility,
- (2) determining type of subsistence base,
- (3) determining the effects of the Hypsithermal in site location and resource exploitation,
- (4) understanding the development of sedentism between the Early and Middle Archaic (Brown and Vierra 1983; Ford 1977).

Late Archaic sites within the region of the Lima facility may represent more permanent settlements with increased population density and group stability. In addition, mortuary sites may occur. The research potential of Late Archaic sites also would be moderately high because they may allow the investigation of increased social and economic complexity which is manifest in later times on the facility.

Early Woodland sites appear to represent an intensification of Late Archaic cultural-ecological adaptations within the region. Occupation

sites occur on bluffs, upper terraces, and hilltops, and may be concentrated along rivers. Scattered semi-permanent villages or hamlets may occur where intensive hunting, plant collecting and fishing are the major economic pursuits of the occupants. The research potential for the Early Woodland sites on the Lima facility is high because they are relatively scarce, and contain the first evidence for a ceramic technology.

Middle Woodland sites generally consist of large burial mounds, geometric earthworks, dispersed hamlets on floodplains and terraces of major rivers, or small base camps or special use sites. Economic pursuits included hunting and gathering of amphibians, birds, fish, mammals, reptiles, shellfish, seeds, and nuts. Horticulture of squash, corn, amaranth, and chenopod also occurred. Middle Woodland sites located in Ohio were related to a larger socio-religious-political unit known as Hopewell. The research potential of Middle Woodland sites is high because they contain evidence that relates to an apparent pattern of increased prehistoric social and economic complexity.

During the Late Woodland in general, and particularly in its latter stages, populations apparently increased as manifested by an increase in numbers of sites and types of sites, artifactual, and subsistence remains. At the same time, dependence on cultivated foods began, particularly maize, beans, and squash. Any Late Woodland sites with integrity on the facility would have high research value because their examination may assist in the regional:

- delineation of terrestrial vs. aquatic resources used by Late Woodland peoples and the determination of the resource availability of each
- determination of the relative importance of fauna derived from major habitats and the examination of the localization of resource exploitation

- reconstruction of the diet of late Late Woodland people and documentation of the prehistoric subsistence change from the Middle Woodland time period.

Finally, the Late Prehistoric period in the vicinity of the Lima ATP consisted of farmsteads, special use camps, and habitation areas. Even though hunting-gathering was still practiced, maize, beans, and squash were intensively cultivated. The research potential of any Late Prehistoric sites that have integrity is likely to be high because they can help in the delineation of subsistence settlement patterns which are currently not well understood and the investigation of ties to historic Native American groups.

Any historic archeological resources on the facility would have high research value because they may allow the investigation of:

- (1) acculturation of Native American communities following direct and indirect contacts with Europeans;
- (2) the sociocultural (especially economic) effects of French and English trade in the area on Native American, Euroamerican, and European cultures;
- (3) adaptations by American Tradition farmers to the local environment and to regional and national economic and political events, including environmental factors affecting the selection of farmsteads and other kinds of sites; exploitation of local resources; degree of self-reliance of farmstead units; dependency on imported manufactured goods; agricultural practices; trade and communication routes; effects of political and economic events (e.g., the Civil War, industrialization) and popular styles as reflected in such things as architecture, furniture, folk art, dress, and grave markers;

- (4) reconstruction of the life styles and sociocultural values of historic Native Americans and of the rural farming communities of the American Tradition.

## 5.2 IDEAL GOALS AND OBJECTIVES

Given the assumption that significant (and presently unidentified) archeological resources are located within the ATP, the following is an outline of a desirable program to manage these resources for the best preservation or use of their research and sociocultural values. An ideal facility archeological resource management program would encompass identification, evaluation, conservation, excavation and analysis, and interpretation activities. It would emphasize the conservation of significant resources, and their excavation or "use" only to mitigate any unavoidable destruction or damaging activities or in search of important information that is being collected and studied within a well designed research project.

Since no archeological resource surveys have been conducted on the Lima ATP, and preliminary archival information has not identified any sites predicted to be on facility lands, the first step in developing a management program is a more intensive and extensive review of oral and archival historic information. The focus of this review would be to evaluate the historical information base presently available without recourse to any historical archeological investigations, and through consultation with professional historians and people with ties to the pre-1940s occupants, evaluate the historic significance of any materials that might be left on the facility. This would complement the more extensive evaluations of natural resource distributions presented within this report as the basis of evaluating the distribution and potential significance of any prehistoric archeological resources there.

The second stage of this management program would be the field inventory of the undisturbed portions of the facility to identify the



surface evidence of any prehistoric or historic archeological sites. Such an identification project would include the pedestrian survey of the facility, with close-interval spacing of survey transects. Large-scale aerial photographs and detailed topographic maps should be used for field reference. Standard forms for recording the surface characteristics of identified prehistoric and historic resources should be completed as part of the inventory procedures and the area and methods of the survey should be well documented. The preferred survey policy for most contemporary projects is to make only minimal collections of artifacts off of site surfaces, retaining only those that are diagnostic of particular styles and/or technologies or are immediately vulnerable to non-professional collection or damage. Any collected materials should be fully described and appropriately curated.

In addition to a description of the surface evidence of these sites, the ideal inventory would include some kinds of subsurface investigation (e.g., augering, test excavation, remote sensing) to evaluate the contents, extent, and integrity of the identified resources. Finally, this stage should include an identification of the important research or other values inherent in the inventoried sites, both as a basis for the development of future research designs and for evaluation of management options should the resource be threatened with damage or destruction by non-archeological-research activities. For purposes of future research development, the identification and evaluation of the resources needs to be well documented and available to the research community. For future resource management purposes, it needs to be appropriately stated within the U. S. Department of the Interior's terminology and concepts of resource significance.

The prevailing professional approach to archeological resources for the past decade has been one of conservation (Lipe 1977:21)--"Our goal... is to see that archaeological resources everywhere are identified, protected, and managed for maximum longevity." Thus, the ideal objective is to develop a "bank" of significant sites that may be investigated

through a variety of techniques, including destructive excavation, only as part of well designed research projects that are scheduled within a regional research program that seeks to maintain the overall range of undisturbed sites for future use. A corollary to this is that the sites should be allowed to be investigated by scientists in a non-reactive situation (i.e., not threatened with immediate destruction of the resource). Such basic investigation of resources on the public lands should be conducted only within research designs that are appropriate to the contemporary regional or broader study questions. It should also be conducted only within a program that includes long-term protection of the information collected from the resources, and a commitment to the public dissemination of that information.

If an archeological site evaluated as being of research or sociocultural significance is going to be damaged or destroyed, the ideal objective would be to preserve its included materials and information values through a data recovery program. Such a program would be little different from the non-reactive investigations discussed above, but is likely to be conducted in conjunction with facility developments. Again, an important element in such a research program would be the adequate analysis, curation, and publication of the recovered information. In the event the installation has accomplished its Section 106 procedures and finds a previously unidentifiable resource during its ground disturbance and/or construction phase, it will effect compliance using 36 CFR 800.7 procedures.

Thus, in summary, the ideal goals for the management of Lima ATP archeological resources are to:

- Inventory and evaluate all the resources on the facility
- Conserve the significant sites, allowing their research use only within a regional research design

- Recover the contents and information from any significant resources threatened by damage or destruction
- Provide the public with the substance of the information values that are inherent within or collected from the facility's archeological resource base.

## A RECOMMENDED ARCHEOLOGICAL MANAGEMENT PLAN FOR THE LIMA ATP

---

### 6.1 FACILITY MASTER PLANS AND PROPOSED IMPACTS

Preliminary plans have been formulated to construct another storage area on a presently undisturbed 53-acre parcel in the southeastern portion of the facility (Rolly Pion, personal communication 1984). No construction date has been finalized. This storage area would be contained within approximately three-fourths (40 acres) of the 53-acre parcel and would impact the area to a depth of one foot. In addition, the military housing units are no longer in use and plans are in progress to lease the two units outside of the southern boundary and to dispose of the one unit in the southeastern corner (Rolly Pion, personal communication 1984). (See Table 6-1 and Figure 6-1 for information on and location of planned activities on the ATP).

### 6.2 APPROPRIATE ARCHEOLOGICAL MANAGEMENT GOALS WITHIN LIMA ATP'S MASTER PLAN

#### 6.2.1 General Facility Planning

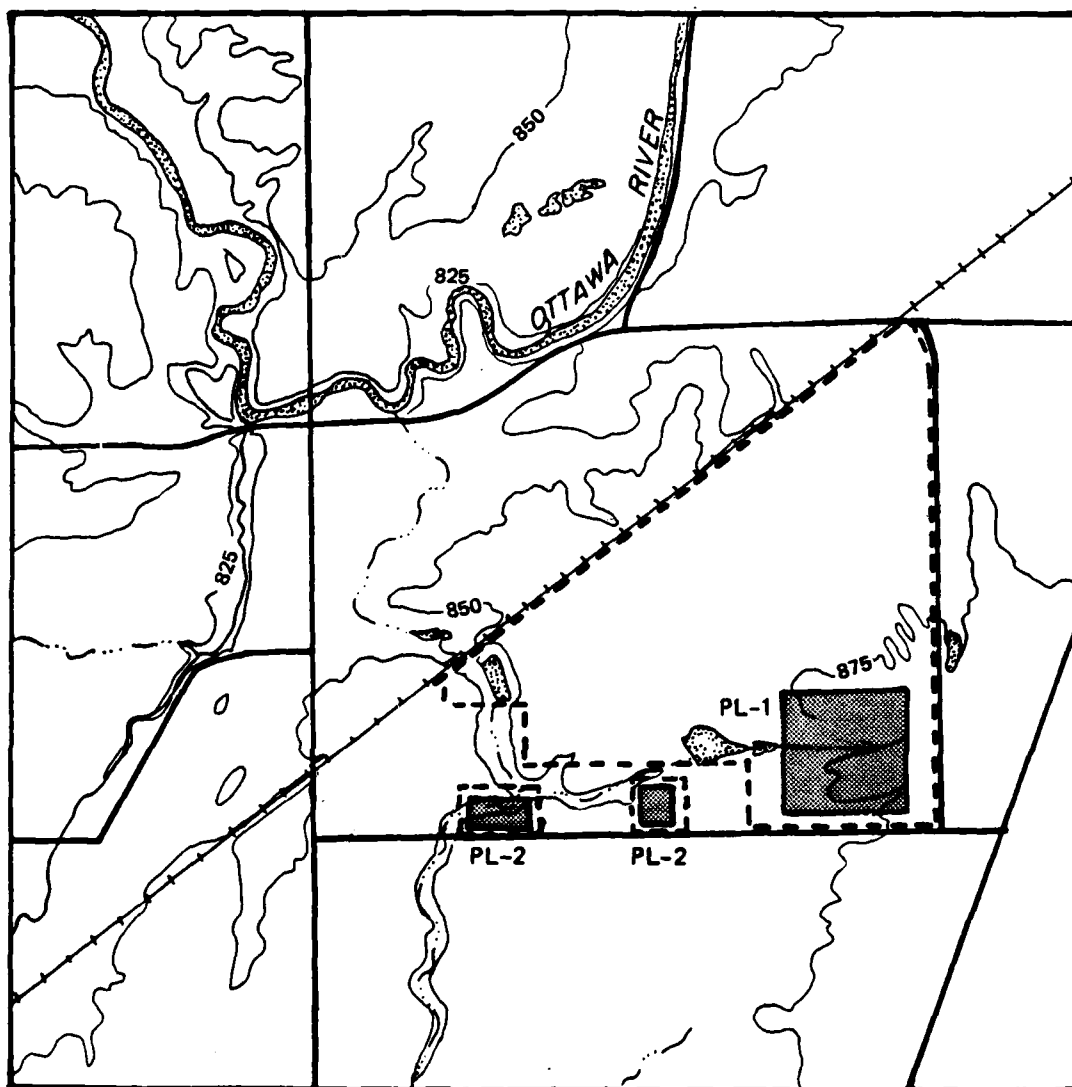
Army Regulation 420-40, drafted pursuant to the National Historic Preservation Act and 36 CFR 800 (Section 1.1), requires that each DARCOM installation have a Historic Preservation Plan or have documentation on file indicating that there are no installation resources appropriate to such management planning. At present there is no such negative declaration; thus, this report is organized so as to provide a basis for such a Plan to be developed and implemented on the facility.

Table 6-1. A SUMMARY OF ON-GOING OR PLANNED ACTIVITIES THAT COULD AFFECT ARCHEOLOGICAL RESOURCES ON THE LIMA ATP

Activities			Estimated			Associated Resources				Impacts		Mitigation Options
Description	Date <sup>a</sup>	Area <sup>b</sup>	Size (a)	Depth Below Surface (ft.)	Ratio of Disturbed to Total Area	Resource Class	Resources Known or Predicted	NRHP Status	Other Value	Direct	Indirect	
Proposed Storage facility	UN	PL-1	40	1	1:1	UN	UN	None	UN	NA	NA	NA
Leasing/disposal of housing units	UN	PL-2	4.3	10	1:3	None	None	None	None	NA	NA	NA

<sup>a</sup> UN = unknown, NA = not applicable.

<sup>b</sup> See Figure 6-1.



LEGEND

■ Areas of proposed activity

0 FT 2000  
0 M 500

Figure 6-1. MAP OF AREAS OF ON-GOING OR PLANNED ACTIVITIES ON THE LIMA ATP THAT COULD AFFECT ARCHEOLOGICAL RESOURCES

The Department of the Army Regulation 420-40 prescribes Army policy procedures and responsibilities for compliance with the National Historic Preservation Act of 1966, as amended; for the maintenance of state-of-the-art standards for preservation, personnel and projects; and for accomplishment of the historic preservation program. The Historic Preservation Plan has the following objectives:

- Provision of historic and archeological data for the installation's information systems
- An outline of priorities for acquiring additional information to determine if there may be additional projects not yet located or identified
- Establishment of a procedure for the evaluation of historic properties
- Provision of guidelines for the management of historic properties
- Implementation of a legally acceptable compliance procedure with the Advisory Council for Historic Preservation (ACHP) and the State Historic Preservation Office (SHPO)
- Integration of historic preservation requirements with the planning and execution of military undertakings such as training, construction, and real property or land use decisions
- Ranking of facility projects by their potential to damage historic properties
- Identification of funding, staffing and milestones needed to implement the plan.

The identification and evaluation of historic and prehistoric resources on the Lima ATP has been initiated by the completion of this overview and plan. This needs to be followed by a full identification and evaluation program as outlined in Section 5.2: more extensive oral and archival historic review; field surface and subsurface inventory of all undisturbed ATP lands; evaluations of resource significance in terms of National Register criteria. Some or all of this recommended work could be postponed until there is a specific ground-disturbing project (i.e., construction of the proposed storage area) that requires compliance with the National Historic Preservation Act (see Sections 1.1, 6.2.2), if development of a historic preservation plan more specific than this document is also to be postponed, and if such scheduling has been accepted by the Ohio State Historic Preservation Office (SHPO).

Under any schedule, until the determination has been made that identified prehistoric or historic sites are not significant they must be managed as if they were, for compliance with Section 110(a)(2) of the National Historic Preservation Act:

(2) With the advice of the Secretary [of the Interior] and in cooperation with the State Historic Preservation Officer for the State involved, each Federal agency shall establish a program to locate, inventory, and nominate to the Secretary all properties under the agency's ownership or control by the agency, that appear to qualify for inclusion on the National Register in accordance with the regulations promulgated under section 101(a)(2)(A). Each Federal agency shall exercise caution to assure that any such property that might qualify for inclusion is not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly [underlining added].

As outlined in the previous discussion of ideal archeological management goals (Section 5.2), a recommended next stage in the assessment of the importance of the facility's historic archeological resources is an intensive review of archival material and evaluation of regional historic research objectives. The archival review might focus on information stored in the National Archives and Records Service, as well as a more intensive review of Allen County land records, wills, and



other pertinent documents and interviews of pre-1940s residents of facility lands. This review and evaluation should include consultation with the Ohio SHPO to identify and prioritize regional historic research questions to which the historic archeological information from identified sites might contribute. The goal of this research would be to define the historic significance that any of the identified sites might have if it had contextual integrity and was to be archeologically investigated.

As discussed in Section 5.2 and required by the National Historic Preservation Act (NHPA), the next step in the identification stage of archeological resource management should be field investigation to locate sites and determine their boundaries, contents, and integrity. NHPA Section 110(a)(2) requires that all federally owned or controlled lands be surveyed to identify all significant archeological properties on them. A strict adherence to this would support the immediate intensive archeological inventory of all Lima ATP lands not previously surveyed or not clearly documented as having deep and extensive modern ground disturbance. The current prevailing federal policy about the implementation of this requirement is that it should be a "reasonable" program consistent with the overall schedules, budget, and multiple objectives of the land-managing agency. It is recommended that it would be most cost-effective to complete the archeological inventory of all undisturbed lands on the facility as soon as it is fiscally possible.

Based on the historic and field inventory information, the significance of all identified sites should be evaluated following criteria set forth in 36 CFR 60.4 and in accordance with guidelines from the Ohio SHPO. If sites are judged to be significant, a plan for their long-term management should be developed in the context of overall property management (including the management of any identified ethnohistoric or historic architectural/engineering resources). Such management activities might include resource conservation in place, biannual field review of site condition, public interpretation of resource values, scientific investigation of the sites, and/or planned

site destruction by military activities. If significant sites are identified, it is recommended that the DARCOM officer responsible for the Lima ATP operations provide the Ohio SHPO with the opportunity to review and comment on the proposed management plan. If the evaluation is made that none of the sites on the ATP is significant, filing of a report to that effect with the SHPO would complete the facility's compliance requirements for preservation planning.

#### 6.2.2 Project-Specific Resource Protection or Treatment Options

Approximately 82 percent of the Lima facility has been impacted by modern construction, and any future ground-disturbing activities in those areas is unlikely to need pre-construction review of its potential adverse impacts to significant archeological resources (the exception might be deep new excavation into previously undisturbed deposits beneath modern buildings or structures). However, new ground-disturbing construction in, or leasing of, ATP land would be a federal undertaking requiring compliance with Section 106 of the National Historic Preservation Act (see Section 1.1 of this report). Section 106 requires that DARCOM consult with the Ohio SHPO and the federal Advisory Council on Historic Preservation about the effects of such an undertaking on significant archeological sites. Without a SHPO-accepted installation preservation plan, it is DARCOM's responsibility to either complete such an evaluation and consultation program for each project or to have on file documentation of the completion of adequate survey and evaluation so as to confirm the absence of or lack of significance of any archeological site that might be affected by the proposed activity.

Since the entire undisturbed portions (18 percent, or 53 acres) of the Lima ATP have not been subjected to intensive archeological survey, construction or ground-disturbance in areas currently unsurveyed could impact archeological resources. As such activities are planned on the ATP, survey and evaluation are recommended. Based on the evaluation, mitigative data recovery (scientific archeological investigation of a significant site) may be necessary on a project-specific basis. Such

evaluation and preservation programs require consultation with several federal agencies. Such a project-specific program can usually be expedited if the appropriate preservation planning has been completed and reviewed by the State Historic Preservation Officer.

**6.2.3 A Summary of Recommended Management Directions and Priorities for Effective Compliance and Program Development**

In order to comply with both long-range historic preservation planning needs and requirements for evaluating the effect of specific proposed development projects on significant archeological resources, the following management activities are recommended. These are listed in their recommended order of priority:

- Consultation with the Ohio State Historic Preservation Office (SHPO) about the recommendations in this overview and plan
- Project-specific survey of any presently undisturbed lands (53 acres) that will be subject to a new federal undertaking soon (i.e., the storage facility within that 53-acre parcel in the southeastern corner), and evaluation of the significance of any archeological resources on them; appropriate treatment of any resources judged to be significant
- Completion of archival and oral historical research to disallow or demonstrate the significance of potential historic archeological sites that may be documented through such research
- Completion of National Register eligibility assessments for any identified archeological resources, which is likely to involve additional field testing of the sites after their historic documentation has been reviewed
- Completion and implementation of a facility historic preservation plan if the resources are determined to be significant.

### 6.3 ESTIMATED SCOPE OF WORK AND COST LEVELS FOR PRESENTLY IDENTIFIABLE MANAGEMENT NEEDS

#### 6.3.1 Scope of Work

The estimated scope of work recommended here is to provide the archival and oral historic evaluation of the significance of the identified historic archeological resources at the Lima facility and the suggested survey of the 53-acre parcel (including consultation with the SHPO). Because the extent of subsequent field investigations (a testing program or additional surface reconnaissance) is recommended to be a function of the historic evaluation and consultation project, no scopes of work or cost levels are provided for such field efforts.

The milestones for the recommended work would be:

- Completion of Part I, a preliminary draft report on the archival and oral historic research documenting the relative importance of the historic archeological resources possible on the Lima ATP, and on needed additional field investigation of any potentially significant sites documented through the research; estimated to require 40 work hours in Ohio and in Washington, DC. Completion of 53-acre survey and preliminary draft report; estimated to require 40 hours
- Completion of DARCOM review of the preliminary draft Part I, as documented by a letter accepting the preliminary draft as appropriate for interagency consultation
- Completion of consultation (including both DARCOM representatives and the historical/archeological consultants) with the Ohio SHPO about the Part I research and evaluations, as documented in a letter of concurrence from the SHPO; estimated to require 40 consultant hours

- Completion of a report that includes the draft Part I and a draft Part II documenting the consultation process and including the statement of SHPO concurrence; estimated to require 60 consultant hours
- DARCOM review and acceptance of the report including both Parts I and II, and provision of the final report to the Ohio SHPO.

#### 6.3.2 Implementation and Cost Estimates

Personnel needed for completion of the above-outlined tasks need professional expertise in historic archival and oral historic research, and in prehistoric and historic archeology. That expertise may reside in one person but is more likely to require work effort by at least two people. The archeological professional qualifications should meet the standards of the U. S. Department of the Interior (1983), and the historical professional qualifications should also meet the standards of the U. S. Department of the Interior (1983) and AR 420-40 guidance. The individual(s) making the archeological resource evaluations of significance should be skilled in management and compliance procedures, have a thorough understanding of regional historical and archeological needs and goals, and have field and/or laboratory experience in the area.

The archivist/historian/archeologist should be supported by adequate secretarial/drafting personnel as they are needed to complete a final report. The physical plant administering implementation of the project should have adequate word processing and duplication capability to quickly and professionally prepare needed documents and correspondence.

Costs of professional archival expertise, including all necessary travel (using expertise local to each of the Washington, DC and Ohio archival research areas), reference, telecommunications, data management, search fee, and report preparation costs generally average between \$25 and \$30 per work-hour across the country for archival research and \$20 to \$25 for reconnaissance survey. This rate does not include business fee

or profit, general and administrative costs, or inflation costs, and is expressed in 1984 dollars. Using this rate, the 140 hours of professional time estimated for archival, consultation, and reporting activities for the recommended scope of work would have a baseline costs of range of \$3500 to \$4200, while the survey work of 40 hours would have baseline costs between \$800 and \$1000. Total costs would range between \$4300 and \$5200.

As a manager of public lands, the Lima Army Tank Plant (ATP) has responsibilities for the management of the natural and cultural resources held on those lands for the general benefit of the American people. This report is an assessment of the prehistoric and historic archeological resources retained on facility lands, and provides a general set of recommendations for the future management of those resources.

No archeological investigations have been conducted on the ATP and no sites are known to exist. Approximately 82 percent of the facility has been impacted by modern construction. A storage area is planned for construction in the southeastern portion of the ATP. In order to more reliably characterize the archeological resources on the facility, both for legal compliance and for general planning purposes, a reconnaissance survey of a 53-acre parcel slated for construction is recommended. Also, to better evaluate and eventually rank research priorities, archival research is required to document any potential historic resources. Oral history research should also be undertaken to better document any potential sites that might be identified through the archival research or field survey.

Completion of a Historic Preservation Plan, in compliance with AR 420-40 and based on information available from this report and from the historic architectural study presently being conducted by the Historic American Buildings Survey, could form the basis for an affirmative cultural resource management program appropriate to a land-managing agency whose fundamental mission is support for America's military.

## BIBLIOGRAPHY

## 8.1 REFERENCES CITED

- Baker, Stanley W. 1978. Preliminary Archaeology Survey of the Proposed Improvement of Shawnee Road near Lima, Ohio (ALL-CR152/SR117). Submitted to Ohio Department of Transportation. Columbus: Ohio Historical Society.
- Brenner, William. 1983. Personal communication. Principal Investigator, DARCOM HABS Survey; Building Technology, Inc., Silver Spring, MD.
- Brown, James, and Robert Vierra. 1983. What Happened in the Middle Archaic? Introduction to an Ecological Approach to Koster Site Archaeology. In Archaic Hunters and Gatherers in the American Midwest, edited by J. Phillips and J. Brown, pp. 165-195. New York: Academic Press.
- Callender, Charles. 1978. Shawnee. In Handbook of North American Indians 15: Northeast, edited by Bruce G. Trigger, pp. 622-635. Washington, DC: Smithsonian Institution.
- Carmichael, David. 1977. Preliminary Archaeological Survey of Illinois Uplands and Some Behavioral Considerations. Midcontinental Journal of Archaeology 2:219-251.
- Carnes, John R., and Beatrice Boose Hughes, editors. 1976. The 1976 History of Allen County, Ohio. Allen County Historical Society and Lima Public Library. Evansville, Indiana: Unigraphic.
- Conrad, Lawrence A. 1981. An Introduction to the Archaeology of Upland West Central Illinois: A Preliminary Archaeological Survey of the Canton to Quincy Corridor for the Proposed FAP 407 Highway Project. Archaeological Research Laboratory 2. Western Illinois University, Macomb.
- Fenneman, Nevin M. 1938. Physiography of the Eastern United States. New York: McGraw Hill.
- Ford, Richard. 1977. Evolutionary Ecology and the Human Ecosystems: A Case Study from the Midwestern U.S.A. In Explanation of Prehistoric Change, edited by J. Hill, pp. 153-184. Albuquerque: University of New Mexico Press.



- Gordon, Robert B. 1966. Natural Vegetation of Ohio. Columbus: Ohio Biological Survey, Ohio State University.
- Hajic, Edwin. 1981. Geology and Paleopedology of the Koster Archeological Site, Greene County, Illinois. M.S. Thesis, Department of Geology, University of Iowa.
- Hassen, Harold, David Asch, Nancy Asch, Edwin Hajic, David Morgan, and Michael Spitzer. 1981. Archeological Reconnaissance of a Proposed Soyland Power Cooperative Electrical Generating Complex. Submitted to Plantec Corporation, Jacksonville, Florida.
- Heffner, R. L., A. R. Brock, R. L. Christman, and D. D. Waters. 1965. Soil Survey - Allen County, Ohio: Series 1960, No. 24. Washington, DC: U. S. Government Printing Office.
- Hunter, William A. History of the Ohio Valley. 1978. In Handbook of North American Indians 15: Northeast, edited by Bruce G. Trigger, pp. 588-593. Washington, DC: Smithsonian Institution.
- Klippel, Walter, and James Maddox. 1977. The Early Archaic of Willow Branch. Midcontinental Journal of Archaeology 2:99-130.
- Knudson, Ruthann, David J. Fee, and Steven E. James. 1983. A Work Plan for the Development of Archeological Overviews and Management Plans for Selected U.S. Department of the Army DARCOM Facilities. Walnut Creek, CA: Woodward-Clyde Consultants [available through the U.S. Department of the Interior, National Park Service, Atlanta].
- Lewis, R. B. 1977. Archaeological Site Densities and Distributions in East-central Illinois. Report submitted to Illinois Department of Conservation, Springfield.
- Lipe, William D. 1977. A Conservation Model for American Archeology. In Conservation Archeology: A Guide for Cultural Resource Management Studies, edited by Michael B. Schiffer and George J. Gumerman, pp. 19-42. New York: Academic Press.
- O'Brien, Michael, Robert Warren, and David Lewarch. 1982. The Cannon Reservoir Human Ecology Project, an Archaeological Study of Cultural Adaptations in the Southern Prairie Peninsula. New York: Academic Press.
- Ogden, J. G., III. 1966. Forest History of Ohio, I: Radiocarbon Dates and Pollen Stratigraphy of Silver Lake, Logan County, Ohio. The Ohio Journal of Science 66(4):387-400.
- Ohio Historic Preservation Office. 1982. Resource Protection Planning Process for Ohio. Final Report: Part I. Ms on file, National Park Service, U.S. Department of the Interior, Washington, DC.

- \_\_\_\_\_. 1983. RP3 Study Unit Reporting Charts, Southwest Ohio. Ms prepared for the U.S. Army, Corps of Engineers, Louisville District; on file, Ohio Historic Preservation Center, Columbus.
- \_\_\_\_\_. 1984. Comments on DARCOM draft report on the Lima ATC, including excerpts from "The Resource Protection Process for Ohio's Historic Resources" and "Resource Protection Planning Process: Ohio - Archaeology" (November 2, 1984). Ms. on file, Ohio Historic Preservation Office, Columbus.
- Ohio State Archaeological Site Survey Files. n.d. Columbus: Ohio Archaeological Council, Ohio Historic Preservation Office, Ohio Historical Center.
- Pion, Rolly. 1984. Personal communication. Facility Engineer, Lima Army Tank Center, Lima, Ohio.
- Roseboom, Eugene H., and Francis P. Weisenburger. 1953. A History of Ohio. Columbus: Ohio State Archaeological and Historical Society.
- U. S. Army. 1977. DARCOM Archeological Overview Project Report, Lima Army Tank Center, Lima, Ohio.
- U. S. Department of the Interior. 1983. Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation: Professional Qualifications Standards. Federal Register 48(190): 44716-44740.
- Warner, Beers, and Company. 1885. History of Allen County, Ohio. Chicago: Warner, Beers and Company.
- Wendland, Wayne. 1978. Holocene Man in North America: The Ecological Setting and Climatic Background. Plains Anthropologist 23:273-287.

## 8.2 OTHER PERTINENT LITERATURE

- Atwater, Caleb. 1820. Description of the Antiquities Discovered in the State of Ohio and other Western States. American Antiquarian Society, Archaeologica Americana, Transactions and Collections 1:105-267. Worcester, Mass.
- Baker, Stanley W., and Bob Genheimer. 1977. Preliminary Archaeological Survey of the Proposed Delphos U. S. Route 30 by-pass. Report submitted to the Ohio Department of Transportation by the Ohio Historical Society, Columbus.
- Beatty, Charles. 1962. Journals of Charles Beatty, 1762-1769. Reprinted. University Park, Pennsylvania: Pennsylvania State University Press.
- Brown, Lloyd Arnold. 1959. Early Maps of the Ohio Valley. Pittsburgh: University of Pittsburgh Press.

- Cady, Annie Cole. 1967. History of Ohio to 1888. Reprinted. Originally published 1888, Belford, Clarke, New York. Athens, Ohio: E. M. Morrison.
- Carpenter, William H., and J. S. Arthur. 1865. The History of Ohio from Its Earliest Settlement to the Present Time. Philadelphia: J. B. Lippincott.
- Chaddock, Robert Emmet. 1967. Ohio Before 1850: A Study of the Early Influence of Pennsylvania and Southern Populations in Ohio. Reprinted. Originally published 1908, as Columbia University Studies in History, Economics, and Public Law XXXI(2). New York: AMS Press.
- Converse, Robert N. 1963. Ohio Flint Types. Ohio Archaeologist 13(4): 77-120.
- \_\_\_\_\_. n.d. The Glacial Kame Indians. Columbus: The Archaeological Society of Ohio.
- Crow, George H., and C. P. Smith. 1935. My State - Ohio: An Authentic History of the Buckeye State. Columbus: Teacher Service Bureau.
- Cunningham, Wilbur M. 1948. A Study of the Glacial Kame Culture in Michigan, Ohio and Indiana. Ann Arbor: University of Michigan Press.
- Cutler, Manasseh. 1966. An Explanation of the Map of Federal Lands. Ann Arbor: University Microfilms.
- Cutter, Jarvis. 1971. A Topographical Description of the State of Ohio. New York: Arno Press.
- Dragoo, Don W. 1959. Archaic Hunters of the Upper Ohio Valley. Carnegie Museum Annals XXXV:139-246.
- \_\_\_\_\_. 1963. Mounds for the Dead: An Analysis of the Adena Culture. Annals of the Carnegie Museum 37.
- \_\_\_\_\_. 1964. The Development of the Adena Culture and its Role in the Formation of Ohio Hopewell. Hopewellian Studies. Springfield: Illinois State Museum.
- Frary, I. T. 1936. Early Homes of Ohio. Richmond, Virginia: Garrett and Massie.
- Galbreath, Charles Burleigh. 1925. History of Ohio. New York: The American Historical Society.
- Griffin, James B. 1943a. The Fort Ancient Aspect. Ann Arbor: University of Michigan Press.

- \_\_\_\_\_. 1943b. Adena Village Site Pottery from Fayette County, Kentucky. In "The Riley Mound, Site Be 15 and the Landing Mound, Site Be 17, Boone County, Kentucky," by W. S. Webb, University of Kentucky Reports in Anthropology and Archaeology 5(7):667-71.
- Guilday, John E. 1971. Biological and archaeological analysis of bones from a 17th century Indian village (46PU31), Putnam County, West Virginia. Report of Archaeological Investigations 4. West Virginia Geological and Economic Survey, Morgantown.
- Harvey, Henry. 1855. History of the Shawnee Indians, from the Year 1681 to 1854, inclusive. Cincinnati, Ohio: Ephraim Morgan and Sons.
- Havighurst, Walter. 1976. Ohio: A Bicentennial History. New York: W. W. Norton.
- Hildreth, Sam P. 1968. Pioneer History, Vols. I and II, abridged. Originally published 1848, by H. W. Derby, Cincinnati. Athens, Ohio: E. M. Morrison.
- Hopkins, Charles Edwin. 1931. Ohio, the Beautiful and Historic. Boston: L. C. Page.
- Howe, Henry. 1889. Historical Collections of Ohio. 2 Vols. Columbus: Henry Howe and Son.
- James, Peggy. 1971. Original Land Entries of Allen County. Reprinted. Ann Arbor: Edwards Brothers.
- Klopfenstein, Carl G. 1976. The Removal of the Indians from Ohio. The Historic Indian in Ohio: A Conference to Commemorate the Bicentennial of the American Revolution. Bicentennial Conference Series 3:28-38. Columbus: Ohio Historical Society.
- Long, Russel J. 1974. Palaeo-Indian Artifacts from the Ada area. Ohio Archaeologist 14 (4):20-21.
- \_\_\_\_\_. 1976. Palaeo-man in the Hog Creek Drainage System. Ohio Archaeologist 26(3):9-11.
- Mayer-Oakes, W. J. 1955. Prehistory of the Upper Ohio Valley: An Introductory Archaeological Study. Annals of the Carnegie Museum 34.
- Mills, Richard S. 1972. Mice, Men and Mastodons. The Explorer 14(2):9-12.
- Mills, William C. 1914. Archaeological Atlas of Ohio - Showing the Distribution of the Various Classes of Prehistoric Remains in the State. Columbus: Ohio State Archaeological and Historical Society.

- Morgan, Richard G. 1952. Outline of Cultures in the Ohio Region. In Archeology of Eastern United States, edited by James B. Griffin, pp. 83-98. Chicago: The University of Chicago Press.
- Morrison, Olin Dee. 1964. Ohio, "Gateway State". Vol. I. Athens, Ohio: E. M. Morrison.
- Prufer, Olaf H. 1965. The McGraw Site, A Study in Hopewellian Dynamics. Cleveland Museum of Natural History Scientific Publications, N.S., 4(2).
- Prufer, Olaf H., and Raymond S. Baby. 1963. Palaeo-Indians of Ohio. Columbus: The Ohio Historical Society.
- Prufer, Olaf H., and Douglas H. McKenzie. 1967. Studies in Ohio Archaeology. Cleveland: The Press of Western Reserve University.
- \_\_\_\_\_. 1975. Studies in Ohio Archaeology. Kent, Ohio: Kent State University Press.
- Randall, E. O., and D. J. Ryan. 1912. History of Ohio, the Rise and Progress of an American State. 5 Vols. New York: Century History.
- Rusler, William. 1921. A Standard History of Allen County, Ohio. Vols. I and II. Chicago: American Historical Society.
- Smith, Thomas. 1977. The Mapping of Ohio. Kent, Ohio: Kent State University Press.
- Society of Professional Archeologists. 1983. The Directory of Professional Archeologists. Tampa, FL: Society of Professional Archeologists.
- Sutton, Robert. 1882. History of Van Wert and Mercer Counties. Wapakoneta, Ohio: R. Sutton.
- Thrower, Norman. 1966. Original Survey and Land Subdivisions. Chicago: Rand McNally.
- Vexler, Robert. 1978. Chronology and Documentary Handbook of the State of Ohio. Dobbs Ferry, New York: Oceana Publications.
- Weisenburger, Francis. 1965. Ohio: A Student's Guide to Localized History. New York: Columbia University Teachers College.
- Wittke, Carl Frederick, editor. 1941-1944. The History of the State of Ohio. 6 Vols. Columbus: Ohio State Archaeological and Historical Society.

Wood, Helen Winemiller. 1976. Pe-Aithch-Ta (PHT or "Falling Tree"): the Allen County Indian chief. The 1976 History of Allen County, Ohio. Allen County Historical Society and Lima Public Library. Evansville, Indiana: Unigraphic, Inc.

Yarnell, Richard Asa. 1964. Aboriginal Relationships Between Culture and Plant Life in the Upper Great Lakes Region. Anthropological Papers 23, Museum of Anthropology, University of Michigan, Ann Arbor.

Yon, Paul. 1973. Guide to Ohio Counties and Municipal Records for Urban Research. Columbus: Archives Library.

**END**

**FILMED**

**11-85**

**DTIC**